

Having described the invention, the following is claimed:

1. An etching solution for etching an electrically resistive material including a nickel-chromium alloy, comprising:  
hydrochloric acid; and  
thiourea.
2. An etching solution according to claim 1, wherein said hydrochloric acid is in a range of 5 volume% to 95 volume%.
3. An etching solution according to claim 2, wherein said hydrochloric acid is about 43 volume%.
4. An etching solution according to claim 1, wherein said thiourea is in a range of 0.1 ppm to 100 grams/liter.
5. An etching solution according to claim 4, wherein said thiourea is in a range of 1 ppm to 20 ppm.
6. An etching solution according to claim 5, wherein said thiourea is in a range of 1 ppm to 2 ppm.
7. An etching solution according to claim 1, wherein said solution further comprises glycerin.
8. An etching solution according to claim 7, wherein said glycerin is in a range of 5 volume% to 95 volume%.
9. An etching solution according to claim 8, wherein said glycerin is about 46 volume%.
10. An etching solution according to claim 1, wherein said solution further comprises water.

201120" 5052007

11. An etching solution according to claim 10, wherein said water is in a quantity sufficient to makeup 100% of volume% total.

12. An etching solution according to claim 1, wherein said solution is at a temperature in a range of room temperature to about boiling point temperature of said solution.

13. An etching solution according to claim 12, wherein said solution is at a temperature in a range of 120°F to 180°F.

14. An etching solution according to claim 13, wherein said solution is at a temperature in a range of 140°F to 150°F.

15. A process for forming an embedded resistor from a resistive foil having a copper layer and a resistive layer, wherein the resistive foil is bonded to a dielectric layer, the method comprising:

selectively removing portions of the copper layer with a copper etchant to form trace lines; and

selectively etching the resistive layer with an etchant comprised of hydrochloric acid and thiourea.

16. A process according to claim 15, wherein a photoresist is applied to the copper layer to define the trace lines.

17. A process according to claim 16, wherein said photoresist is not removed prior to the selective etching of the resistive layer.

18. A process according to claim 16, wherein said photoresist is removed prior to the selective etching of the resistive layer.

19. A process according to claim 15, wherein said hydrochloric acid is in a range of 5 volume% to 95 volume%.

2017-03-29 09:56:20

20. A process according to claim 19, wherein said hydrochloric acid is about 43 volume%.

21. A process according to claim 15, wherein said thiourea is in a range of 0.1ppm to 100 grams/liter.

22. A process according to claim 21, wherein said thiourea is in a range of 1 ppm to 20 ppm.

23. A process according to claim 22, wherein said thiourea is in a range of 1 ppm to 2 ppm.

24. A process according to claim 15, wherein said solution further comprises glycerin.

25. A process according to claim 24, wherein said glycerin is in a range of 5 volume% to 95 volume%.

26. A process according to claim 25, wherein said glycerin is about 46 volume%.

27. A process according to claim 15, wherein said solution further comprises water.

28. A process according to claim 27, wherein said water is in a quantity sufficient to makeup 100% of volume% total.

29. A process according to claim 15, wherein said solution is at a temperature in a range of room temperature to about boiling point temperature of said solution.

2011-03-29 10:05:20

30. A process according to claim 29, wherein said solution is at a temperature in a range of 120°F to 180°F.

31. A process according to claim 30, wherein said solution is at a temperature in a range of 140°F to 150°F.

2017-09-08 10:55:20